



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 18, 2025 – 11:51 AM EST

PDB ID : 9MWO / pdb_00009mwo
Title : Structure of human endothelial nitric oxide synthase heme domain bound with N-(4-(2-((3-(thiophene-2-carboximidamido)benzyl)amino)ethyl)phenyl)thiophene-2-carboximidamide
Authors : Li, H.; Poulos, T.L.
Deposited on : 2025-01-17
Resolution : 1.76 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

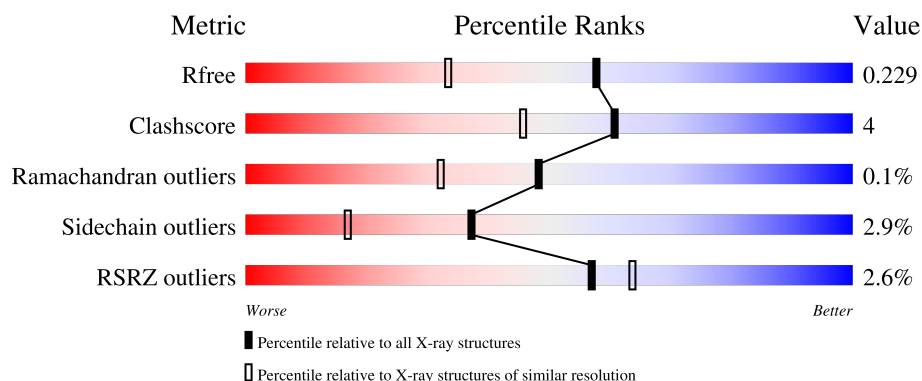
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

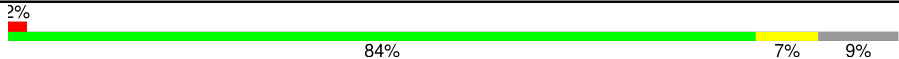



The reported resolution of this entry is 1.76 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	2888 (1.76-1.76)
Clashscore	180529	3097 (1.76-1.76)
Ramachandran outliers	177936	3072 (1.76-1.76)
Sidechain outliers	177891	3072 (1.76-1.76)
RSRZ outliers	164620	2887 (1.76-1.76)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	440	
1	B	440	
1	C	440	
1	D	440	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	BTB	B	509	-	-	X	-

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 14203 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

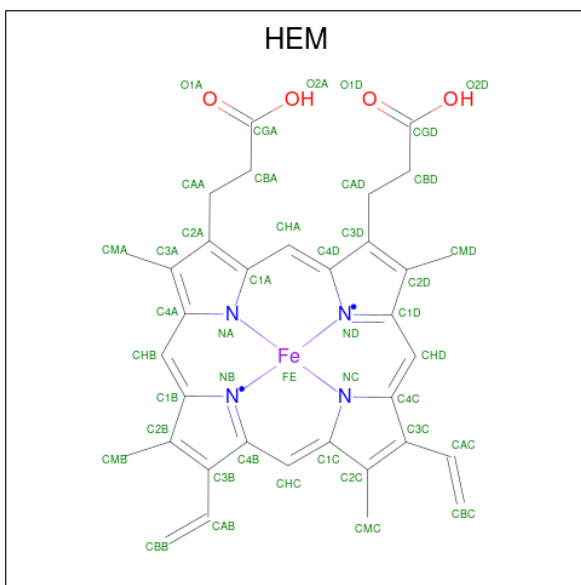
- Molecule 1 is a protein called Nitric oxide synthase, endothelial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	402	Total	C	N	O	S	0	3	0
			3223	2052	567	588	16			
1	B	403	Total	C	N	O	S	0	4	0
			3238	2061	570	590	17			
1	C	402	Total	C	N	O	S	0	3	0
			3223	2052	567	588	16			
1	D	402	Total	C	N	O	S	0	5	0
			3230	2057	566	590	17			

There are 4 discrepancies between the modelled and reference sequences:

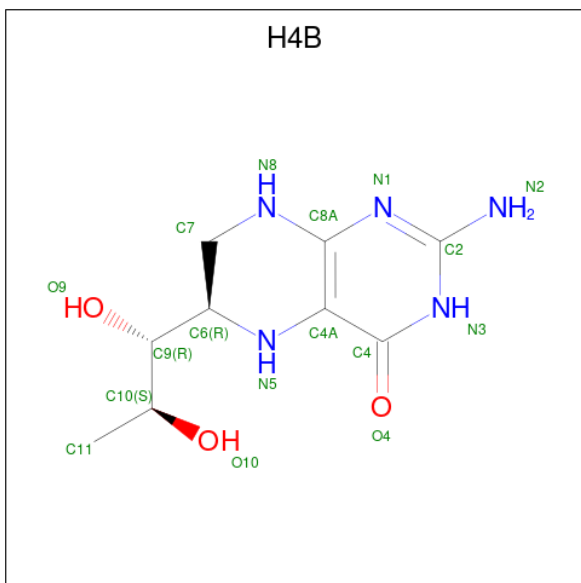
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



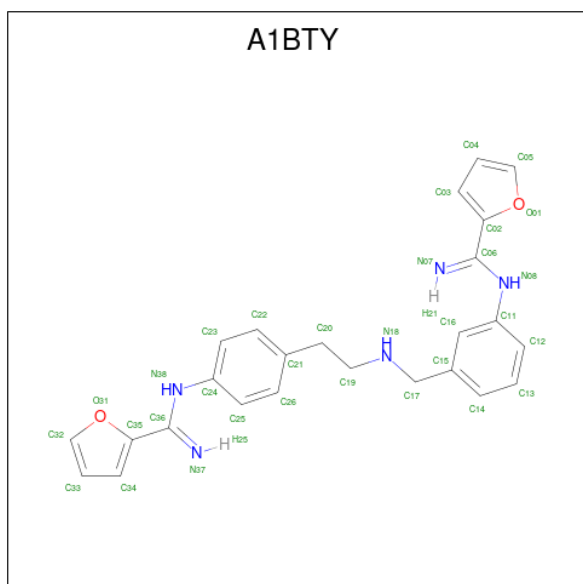
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	C	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	D	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

- Molecule 3 is 5,6,7,8-TETRAHYDROBIOPTERIN (CCD ID: H4B) (formula: $\text{C}_9\text{H}_{15}\text{N}_5\text{O}_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	B	1	Total	C	N	O	0	0
			17	9	5	3		
3	C	1	Total	C	N	O	0	0
			17	9	5	3		
3	D	1	Total	C	N	O	0	0
			17	9	5	3		

- Molecule 4 is N-[3-([2-(4-[(E)-(furan-2-yl)(imino)methyl]amino}phenyl)ethyl]amino}methyl)phenyl]furan-2-carboximidamide (CCD ID: A1BTY) (formula: C₂₅H₂₅N₅O₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			32	25	5	2		
4	B	1	Total	C	N	O	0	0
			32	25	5	2		
4	C	1	Total	C	N	O	0	0
			32	25	5	2		
4	D	1	Total	C	N	O	0	0
			32	25	5	2		

- Molecule 5 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (CCD ID: BTB) (formula: C₈H₁₉NO₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	C	1	Total	C	N	O	0	0
			14	8	1	5		
5	C	1	Total	C	N	O	0	0
			14	8	1	5		
5	D	1	Total	C	N	O	0	0
			14	8	1	5		
5	D	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			6	3	3		
6	A	1	Total	C	O	0	0
			6	3	3		
6	B	1	Total	C	O	0	0
			6	3	3		
6	C	1	Total	C	O	0	0
			6	3	3		
6	C	1	Total	C	O	0	0
			6	3	3		
6	C	1	Total	C	O	0	0
			6	3	3		
6	D	1	Total	C	O	0	0
			6	3	3		

- Molecule 7 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Cl	0	0
			1	1		
7	B	1	Total	Cl	0	0
			1	1		
7	C	1	Total	Cl	0	0
			1	1		
7	D	1	Total	Cl	0	0
			1	1		

- Molecule 8 is GADOLINIUM ATOM (CCD ID: GD) (formula: Gd).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	2	Total 2	Gd 2	0	0
8	B	1	Total 1	Gd 1	0	0
8	C	1	Total 1	Gd 1	0	0
8	D	1	Total 1	Gd 1	0	0

- Molecule 9 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	1	Total 1	Zn 1	0	0
9	C	1	Total 1	Zn 1	0	0

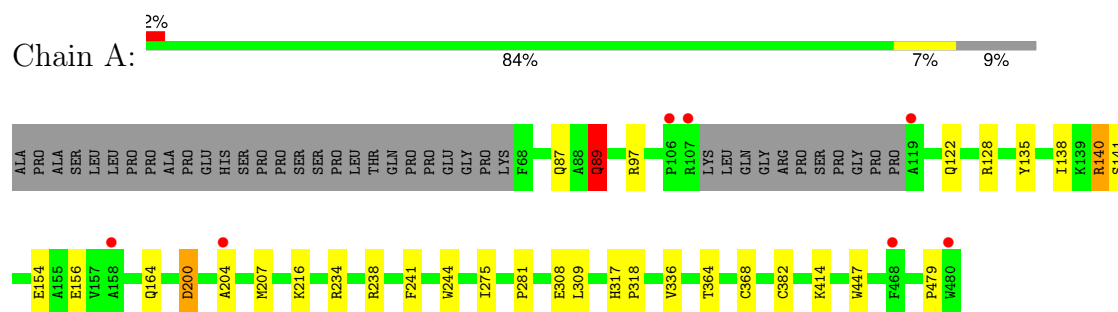
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	156	Total 156	O 156	0	0
10	B	230	Total 230	O 230	0	0
10	C	125	Total 125	O 125	0	0
10	D	217	Total 217	O 217	0	0

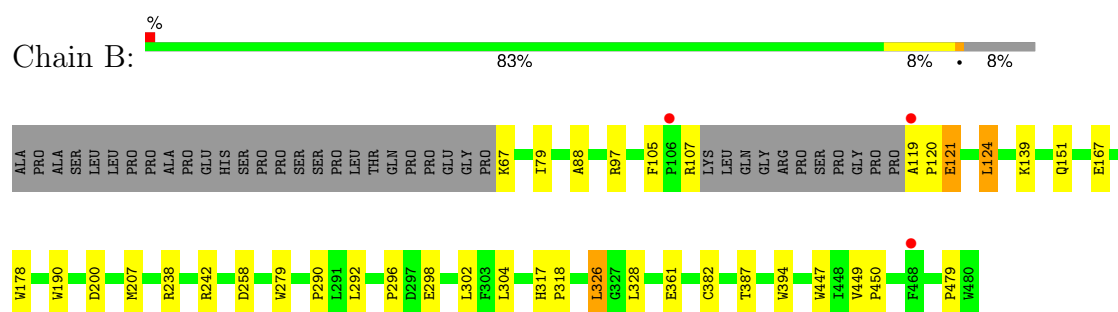
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

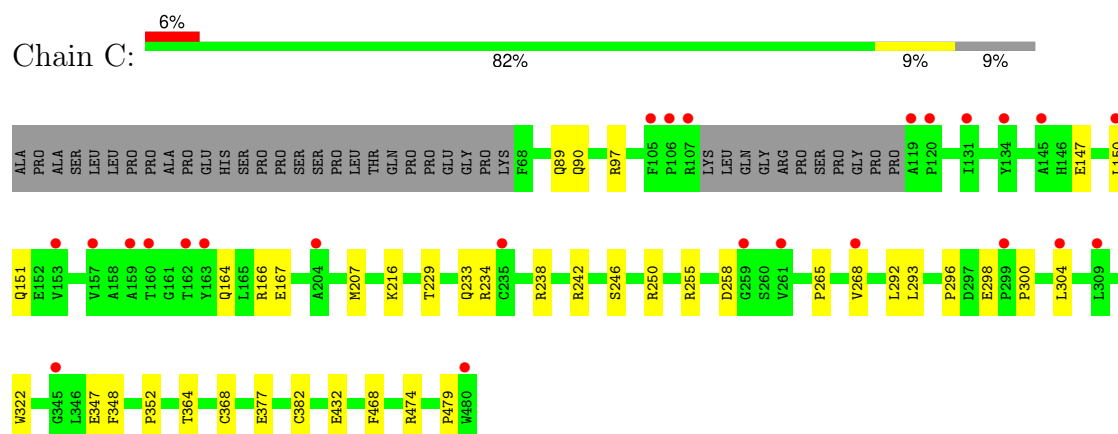
- Molecule 1: Nitric oxide synthase, endothelial



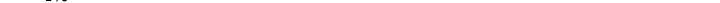
- Molecule 1: Nitric oxide synthase, endothelial

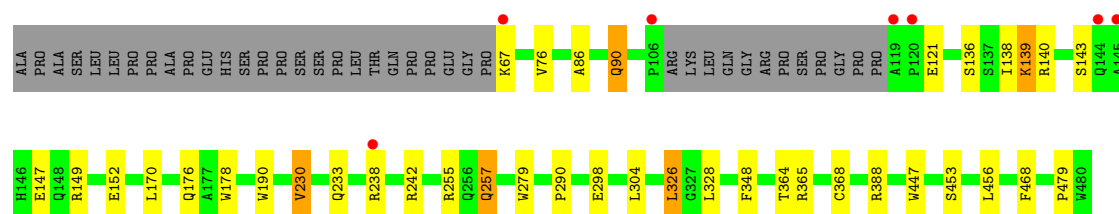


- Molecule 1: Nitric oxide synthase, endothelial



- Molecule 1: Nitric oxide synthase, endothelial

Chain D:  2% 82% 8% 9%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	59.63Å 153.20Å 108.93Å 90.00° 90.86° 90.00°	Depositor
Resolution (Å)	39.91 – 1.76 39.91 – 1.76	Depositor EDS
% Data completeness (in resolution range)	96.8 (39.91-1.76) 97.3 (39.91-1.76)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.40 (at 1.76Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.202 , 0.233 0.199 , 0.229	Depositor DCC
R_{free} test set	9359 reflections (4.22%)	wwPDB-VP
Wilson B-factor (Å ²)	30.4	Xtriage
Anisotropy	0.570	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 43.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.066 for h,-k,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	14203	wwPDB-VP
Average B, all atoms (Å ²)	49.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.39% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, ZN, BTB, A1BTY, HEM, GD, H4B, CL

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.26	0/3324	0.45	0/4529
1	B	0.31	0/3339	0.48	0/4549
1	C	0.24	0/3324	0.43	0/4529
1	D	0.30	0/3334	0.47	0/4543
All	All	0.28	0/13321	0.46	0/18150

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3223	0	3127	15	0
1	B	3238	0	3145	23	0
1	C	3223	0	3127	23	0
1	D	3230	0	3137	22	0
2	A	43	0	30	3	0
2	B	43	0	30	2	0
2	C	43	0	30	2	0
2	D	43	0	30	2	0
3	A	17	0	15	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	17	0	15	1	0
3	C	17	0	15	0	0
3	D	17	0	15	1	0
4	A	32	0	0	2	0
4	B	32	0	0	2	0
4	C	32	0	0	0	0
4	D	32	0	0	1	0
5	A	42	0	56	5	0
5	B	42	0	54	11	0
5	C	28	0	38	5	0
5	D	28	0	38	5	0
6	A	12	0	16	0	0
6	B	6	0	8	0	0
6	C	18	0	24	1	0
6	D	6	0	8	2	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	D	1	0	0	0	0
8	A	2	0	0	0	0
8	B	1	0	0	0	0
8	C	1	0	0	0	0
8	D	1	0	0	0	0
9	A	1	0	0	0	0
9	C	1	0	0	0	0
10	A	156	0	0	0	0
10	B	230	0	0	1	0
10	C	125	0	0	2	0
10	D	217	0	0	2	0
All	All	14203	0	12958	108	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (108) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:200:ASP:OD1	1:A:200:ASP:N	2.23	0.71
5:B:509:BTB:H61	1:C:322:TRP:CD1	2.26	0.70
1:C:207:MET:HE3	1:C:293:LEU:HB3	1.77	0.67
1:C:377:GLU:OE1	5:C:504:BTB:O1	2.12	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:501:HEM:HBC2	2:C:501:HEM:HMC2	1.77	0.67
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.78	0.66
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.77	0.66
1:A:87:GLN:O	1:A:89:GLN:NE2	2.29	0.65
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.80	0.64
1:A:135:TYR:HD1	1:A:140:ARG:HB2	1.63	0.63
1:A:204:ALA:HA	1:A:207:MET:HE3	1.80	0.63
1:D:170:LEU:HD21	1:D:230:VAL:HG11	1.82	0.62
1:B:382:CYS:SG	5:B:509:BTB:H42	2.41	0.61
1:A:382:CYS:HA	5:A:504:BTB:H11	1.85	0.59
1:C:147:GLU:HA	1:C:150:LEU:HD12	1.85	0.59
2:A:501:HEM:HMC2	2:A:501:HEM:HBC2	1.84	0.58
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.88	0.56
2:B:501:HEM:HBC2	2:B:501:HEM:HMC2	1.88	0.55
1:C:90:GLN:HB3	1:C:468:PHE:CD2	2.42	0.55
1:D:138:ILE:HG13	1:D:140:ARG:HG2	1.88	0.55
1:A:138:ILE:HG13	1:A:140:ARG:HG2	1.90	0.53
5:C:504:BTB:O1	5:C:504:BTB:H51	2.09	0.53
1:B:105:PHE:C	1:B:107:ARG:H	2.17	0.53
1:D:298:GLU:OE1	5:D:505:BTB:H41	2.09	0.52
1:D:365:ARG:HH22	6:D:506:GOL:H32	1.74	0.52
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.90	0.52
1:C:292:LEU:HD22	1:C:300:PRO:HB2	1.92	0.52
1:B:121:GLU:HA	1:B:124:LEU:HB2	1.91	0.51
1:B:290:PRO:HB3	1:B:304:LEU:HD23	1.92	0.51
1:D:242:ARG:NH2	1:D:479:PRO:HD3	2.26	0.51
1:C:234:ARG:NH1	1:C:347:GLU:OE1	2.42	0.51
1:B:326:LEU:CD1	5:B:509:BTB:H41	2.41	0.51
1:C:166:ARG:HD2	10:C:632:HOH:O	2.11	0.51
1:A:128:ARG:HH22	1:A:154:GLU:CD	2.18	0.50
2:D:501:HEM:HMC2	2:D:501:HEM:HBC2	1.93	0.50
1:B:139:LYS:N	1:B:139:LYS:HD2	2.27	0.50
1:D:139:LYS:O	1:D:140:ARG:HD2	2.12	0.49
1:C:97:ARG:NH2	1:D:86:ALA:O	2.45	0.49
1:D:447:TRP:HA	3:D:502:H4B:N1	2.27	0.49
5:D:505:BTB:O6	5:D:505:BTB:O4	2.28	0.49
1:B:326:LEU:HD12	5:B:509:BTB:H41	1.93	0.49
1:B:387:THR:HA	1:B:394:TRP:CD1	2.48	0.49
1:D:364:THR:O	1:D:368:CYS:HB2	2.12	0.48
1:A:364:THR:O	1:A:368:CYS:HB2	2.14	0.48
1:D:233:GLN:HB3	1:D:348:PHE:CE2	2.49	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:506:BTB:H42	5:A:506:BTB:H72	1.55	0.48
1:D:326:LEU:HB3	1:D:328:LEU:HG	1.95	0.47
1:B:447:TRP:HA	3:B:502:H4B:N1	2.30	0.47
1:C:238:ARG:HH21	1:C:296:PRO:HG2	1.80	0.47
1:C:265:PRO:HA	1:C:268:VAL:HG23	1.97	0.46
1:B:178:TRP:CE3	1:B:190:TRP:HA	2.51	0.46
1:A:275:ILE:HG12	1:A:281:PRO:HG3	1.97	0.46
1:C:89:GLN:N	1:C:89:GLN:OE1	2.49	0.46
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.97	0.46
1:B:242:ARG:CZ	1:B:479:PRO:HG3	2.46	0.46
5:B:509:BTB:H51	5:B:509:BTB:H32	1.60	0.45
5:C:504:BTB:H72	5:C:504:BTB:H41	1.46	0.45
5:D:505:BTB:H71	5:D:505:BTB:O1	2.13	0.45
1:A:244:TRP:CD1	1:A:479:PRO:HG2	2.51	0.45
1:B:238:ARG:HD3	1:B:296:PRO:HB3	1.98	0.45
4:A:503:A1BTY:C02	4:A:503:A1BTY:C12	2.94	0.45
1:C:364:THR:O	1:C:368:CYS:HB2	2.16	0.45
1:D:143:SER:O	1:D:147:GLU:HG2	2.17	0.44
5:A:506:BTB:H51	5:A:506:BTB:H12	1.53	0.44
1:B:151:GLN:NE2	10:B:602:HOH:O	2.51	0.44
1:D:257:GLN:H	1:D:257:GLN:HG2	1.46	0.44
1:D:453:SER:HB3	1:D:456:LEU:HD12	2.00	0.44
2:A:501:HEM:HHC	2:A:501:HEM:CBB	2.47	0.44
5:B:509:BTB:C1	1:C:382:CYS:HA	2.48	0.43
1:A:336:VAL:HG21	4:A:503:A1BTY:C14	2.48	0.43
5:B:505:BTB:H72	5:B:505:BTB:H11	1.39	0.43
1:A:447:TRP:HA	3:A:502:H4B:N1	2.33	0.43
1:D:365:ARG:HH22	6:D:506:GOL:C3	2.32	0.43
1:B:119:ALA:N	1:B:120:PRO:HD3	2.33	0.43
1:C:167:GLU:OE2	6:C:506:GOL:H11	2.19	0.43
1:A:317:HIS:CG	1:A:318:PRO:HD2	2.54	0.42
5:A:504:BTB:H32	5:A:504:BTB:H51	1.82	0.42
5:B:505:BTB:H51	5:B:505:BTB:H32	1.32	0.42
4:B:503:A1BTY:C02	4:B:503:A1BTY:C12	2.96	0.42
1:B:361:GLU:OE1	4:B:503:A1BTY:N08	2.52	0.42
1:B:97:ARG:HB3	1:B:97:ARG:NH1	2.34	0.42
1:A:207:MET:HE2	1:A:241:PHE:HD2	1.84	0.42
1:C:298:GLU:OE1	5:C:507:BTB:H42	2.19	0.42
1:B:449:VAL:HA	1:B:450:PRO:HD3	1.92	0.42
1:D:149:ARG:NH1	1:D:152:GLU:OE1	2.52	0.42
1:B:326:LEU:HB3	1:B:328:LEU:HG	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:C:504:BTB:H42	5:C:504:BTB:HO1	1.78	0.42
5:D:505:BTB:H52	5:D:505:BTB:H81	1.43	0.42
1:B:298:GLU:OE1	5:B:505:BTB:O4	2.32	0.41
1:B:317:HIS:CG	1:B:318:PRO:HD2	2.54	0.41
5:B:509:BTB:H11	1:C:382:CYS:HA	2.03	0.41
1:D:140:ARG:NH2	10:D:603:HOH:O	2.44	0.41
1:D:176:GLN:HG2	10:D:682:HOH:O	2.20	0.41
1:C:246:SER:OG	1:C:250:ARG:HD2	2.21	0.41
1:C:258:ASP:OD2	1:C:258:ASP:N	2.54	0.41
4:D:503:A1BTY:C12	4:D:503:A1BTY:C02	2.98	0.41
5:D:504:BTB:H12	5:D:504:BTB:H72	1.75	0.41
5:A:505:BTB:H11	5:A:505:BTB:H51	1.69	0.41
1:B:292:LEU:HD23	1:B:292:LEU:HA	1.98	0.41
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.56	0.41
1:D:90:GLN:HB2	1:D:468:PHE:CD2	2.57	0.40
1:A:97:ARG:NH2	1:B:88:ALA:O	2.55	0.40
5:B:509:BTB:H52	5:B:509:BTB:H12	1.88	0.40
1:C:229:THR:O	1:C:352:PRO:HD2	2.20	0.40
1:C:242:ARG:NH2	1:C:479:PRO:HD3	2.36	0.40
1:C:432:GLU:HG2	10:C:605:HOH:O	2.21	0.40
1:D:279:TRP:CD1	1:D:290:PRO:HG3	2.56	0.40
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	401/440 (91%)	387 (96%)	13 (3%)	1 (0%)	44	28
1	B	403/440 (92%)	395 (98%)	8 (2%)	0	100	100
1	C	401/440 (91%)	386 (96%)	15 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	403/440 (92%)	394 (98%)	9 (2%)	0	100	100
All	All	1608/1760 (91%)	1562 (97%)	45 (3%)	1 (0%)	48	32

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	89	GLN

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	344/373 (92%)	331 (96%)	13 (4%)	28	10
1	B	346/373 (93%)	337 (97%)	9 (3%)	41	21
1	C	344/373 (92%)	338 (98%)	6 (2%)	56	39
1	D	346/373 (93%)	333 (96%)	13 (4%)	28	10
All	All	1380/1492 (92%)	1339 (97%)	41 (3%)	37	15

All (41) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	89	GLN
1	A	122	GLN
1	A	140	ARG
1	A	141	SER
1	A	156	GLU
1	A	164	GLN
1	A	200	ASP
1	A	216	LYS
1	A	234	ARG
1	A	238	ARG
1	A	308	GLU
1	A	309	LEU
1	A	414	LYS

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Mol	Chain	Res	Type
1	B	67	LYS
1	B	79	ILE
1	B	121	GLU
1	B	124	LEU
1	B	167	GLU
1	B	200	ASP
1	B	207	MET
1	B	258	ASP
1	B	326	LEU
1	C	151	GLN
1	C	164	GLN
1	C	216	LYS
1	C	255	ARG
1	C	304	LEU
1	C	474	ARG
1	D	67	LYS
1	D	76	VAL
1	D	90	GLN
1	D	121	GLU
1	D	136[A]	SER
1	D	136[B]	SER
1	D	139	LYS
1	D	230	VAL
1	D	238	ARG
1	D	255	ARG
1	D	257	GLN
1	D	326	LEU
1	D	388	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	194	GLN
1	A	233	GLN
1	B	90	GLN
1	B	256	GLN
1	C	164	GLN
1	C	205	GLN
1	D	126	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 40 ligands modelled in this entry, 11 are monoatomic - leaving 29 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
6	GOL	D	506	-	5,5,5	0.42	0	5,5,5	0.37	0
3	H4B	D	502	-	16,18,18	0.90	0	14,26,26	2.41	5 (35%)
5	BTB	A	505	8	13,13,13	0.79	0	7,16,16	1.29	1 (14%)
5	BTB	D	504	8	13,13,13	0.42	0	7,16,16	0.54	0
4	A1BTY	C	503	-	27,35,35	0.92	3 (11%)	27,46,46	0.83	0
4	A1BTY	B	503	-	27,35,35	1.02	4 (14%)	27,46,46	1.25	3 (11%)
3	H4B	C	502	-	16,18,18	0.84	0	14,26,26	2.46	4 (28%)
5	BTB	A	506	-	13,13,13	0.40	0	7,16,16	0.38	0
6	GOL	B	506	-	5,5,5	0.36	0	5,5,5	0.29	0
2	HEM	B	501	1	42,50,50	1.64	8 (19%)	46,82,82	1.79	10 (21%)
5	BTB	B	505	-	13,13,13	0.53	0	7,16,16	0.75	0
6	GOL	C	508	-	5,5,5	0.39	0	5,5,5	0.42	0
6	GOL	C	509	-	5,5,5	0.35	0	5,5,5	0.36	0
5	BTB	C	507	-	13,13,13	0.35	0	7,16,16	0.25	0
5	BTB	D	505	-	13,13,13	0.42	0	7,16,16	0.58	0
6	GOL	A	508	-	5,5,5	0.46	0	5,5,5	1.04	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	H4B	A	502	-	16,18,18	0.91	0	14,26,26	2.47	4 (28%)
5	BTB	A	504	8	13,13,13	0.54	0	7,16,16	0.81	0
2	HEM	A	501	1	42,50,50	1.52	7 (16%)	46,82,82	1.82	9 (19%)
6	GOL	C	506	-	5,5,5	0.38	0	5,5,5	0.40	0
5	BTB	B	509	8	13,13,13	0.46	0	7,16,16	1.01	0
5	BTB	C	504	-	13,13,13	0.52	0	7,16,16	0.93	0
6	GOL	A	507	-	5,5,5	0.25	0	5,5,5	0.57	0
4	A1BTY	D	503	-	27,35,35	0.97	3 (11%)	27,46,46	1.41	5 (18%)
2	HEM	C	501	1	42,50,50	1.52	6 (14%)	46,82,82	1.65	11 (23%)
2	HEM	D	501	1	42,50,50	1.55	7 (16%)	46,82,82	1.63	9 (19%)
5	BTB	B	504	8	13,13,13	0.40	0	7,16,16	0.52	0
4	A1BTY	A	503	-	27,35,35	1.03	4 (14%)	27,46,46	1.14	2 (7%)
3	H4B	B	502	-	16,18,18	0.79	0	14,26,26	2.39	6 (42%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	GOL	D	506	-	-	2/4/4/4	-
3	H4B	D	502	-	-	0/8/17/17	0/2/2/2
5	BTB	A	505	8	-	7/21/21/21	-
5	BTB	D	504	8	-	0/21/21/21	-
4	A1BTY	C	503	-	-	4/15/23/23	0/4/4/4
4	A1BTY	B	503	-	-	5/15/23/23	0/4/4/4
3	H4B	C	502	-	-	0/8/17/17	0/2/2/2
5	BTB	A	506	-	-	4/21/21/21	-
6	GOL	B	506	-	-	2/4/4/4	-
2	HEM	B	501	1	-	0/12/54/54	-
5	BTB	B	505	-	-	13/21/21/21	-
6	GOL	C	508	-	-	2/4/4/4	-
6	GOL	C	509	-	-	2/4/4/4	-
5	BTB	C	507	-	-	2/21/21/21	-
5	BTB	D	505	-	-	15/21/21/21	-
6	GOL	A	508	-	-	4/4/4/4	-
3	H4B	A	502	-	-	0/8/17/17	0/2/2/2
5	BTB	A	504	8	-	6/21/21/21	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	HEM	A	501	1	-	0/12/54/54	-
6	GOL	C	506	-	-	4/4/4/4	-
5	BTB	B	509	8	-	3/21/21/21	-
5	BTB	C	504	-	-	11/21/21/21	-
6	GOL	A	507	-	-	0/4/4/4	-
4	A1BTY	D	503	-	-	4/15/23/23	0/4/4/4
2	HEM	C	501	1	-	2/12/54/54	-
2	HEM	D	501	1	-	0/12/54/54	-
5	BTB	B	504	8	-	4/21/21/21	-
4	A1BTY	A	503	-	-	6/15/23/23	0/4/4/4
3	H4B	B	502	-	-	0/8/17/17	0/2/2/2

All (42) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	HEM	C3C-C4C	4.07	1.47	1.41
2	C	501	HEM	C3C-C2C	-3.71	1.35	1.40
2	B	501	HEM	C3C-CAC	3.66	1.55	1.47
2	B	501	HEM	C3C-C2C	-3.64	1.35	1.40
2	D	501	HEM	C3C-C4C	3.54	1.46	1.41
2	A	501	HEM	C3C-C2C	-3.49	1.35	1.40
2	C	501	HEM	CAB-C3B	3.43	1.56	1.47
2	C	501	HEM	C3C-CAC	3.43	1.55	1.47
2	A	501	HEM	C3C-CAC	3.33	1.55	1.47
2	D	501	HEM	C3C-CAC	3.29	1.55	1.47
2	D	501	HEM	CAB-C3B	3.27	1.56	1.47
2	B	501	HEM	CAB-C3B	3.12	1.55	1.47
2	A	501	HEM	CAB-C3B	3.11	1.55	1.47
2	D	501	HEM	C3C-C2C	-2.93	1.36	1.40
2	A	501	HEM	C3C-C4C	2.92	1.45	1.41
2	B	501	HEM	FE-NB	2.81	2.13	1.98
4	A	503	A1BTY	C11-N08	-2.79	1.36	1.41
2	C	501	HEM	C3C-C4C	2.77	1.45	1.41
2	D	501	HEM	FE-NB	2.74	2.13	1.98
2	C	501	HEM	FE-NB	2.68	2.13	1.98
4	D	503	A1BTY	C24-N38	-2.68	1.36	1.41
2	A	501	HEM	FE-NB	2.65	2.12	1.98
4	B	503	A1BTY	C06-N08	-2.60	1.33	1.38
4	B	503	A1BTY	C24-N38	-2.50	1.36	1.41
4	A	503	A1BTY	C24-N38	-2.41	1.36	1.41
4	C	503	A1BTY	C11-N08	-2.39	1.36	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	HEM	CMB-C2B	2.32	1.55	1.50
4	D	503	A1BTY	C06-N08	-2.32	1.34	1.38
2	D	501	HEM	CMD-C2D	2.30	1.55	1.50
4	B	503	A1BTY	C11-N08	-2.28	1.37	1.41
4	D	503	A1BTY	C36-N38	-2.28	1.34	1.38
2	B	501	HEM	CMD-C2D	2.26	1.55	1.50
2	A	501	HEM	CMD-C2D	2.24	1.55	1.50
4	B	503	A1BTY	C36-N38	-2.20	1.34	1.38
4	C	503	A1BTY	C06-N08	-2.19	1.34	1.38
4	A	503	A1BTY	C06-N08	-2.18	1.34	1.38
4	C	503	A1BTY	C24-N38	-2.15	1.37	1.41
2	B	501	HEM	FE-ND	2.12	2.09	1.98
4	A	503	A1BTY	C36-N38	-2.09	1.34	1.38
2	B	501	HEM	CMB-C2B	2.07	1.55	1.50
2	D	501	HEM	CMB-C2B	2.03	1.54	1.50
2	C	501	HEM	CMB-C2B	2.03	1.54	1.50

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	502	H4B	C8A-C4A-C4	6.04	120.00	114.50
3	C	502	H4B	C8A-C4A-C4	5.67	119.66	114.50
3	B	502	H4B	C8A-C4A-C4	5.52	119.53	114.50
2	B	501	HEM	CBA-CAA-C2A	-5.51	103.27	112.54
2	A	501	HEM	C4B-CHC-C1C	5.49	129.80	122.56
3	D	502	H4B	C8A-C4A-C4	5.29	119.31	114.50
2	D	501	HEM	CBA-CAA-C2A	-5.20	103.80	112.54
2	A	501	HEM	CBA-CAA-C2A	-5.17	103.85	112.54
2	B	501	HEM	C4B-CHC-C1C	5.15	129.35	122.56
2	C	501	HEM	C4B-CHC-C1C	3.78	127.55	122.56
2	C	501	HEM	CBA-CAA-C2A	-3.78	106.18	112.54
3	D	502	H4B	N1-C2-N3	-3.72	119.77	125.48
3	C	502	H4B	C2-N3-C4	3.69	121.09	115.96
4	D	503	A1BTY	C15-C17-N18	-3.68	101.19	112.79
2	D	501	HEM	C4B-CHC-C1C	3.62	127.33	122.56
3	D	502	H4B	C2-N3-C4	3.56	120.91	115.96
3	A	502	H4B	N1-C2-N3	-3.41	120.25	125.48
3	C	502	H4B	N1-C2-N3	-3.39	120.29	125.48
3	B	502	H4B	C2-N3-C4	3.39	120.67	115.96
3	A	502	H4B	C2-N3-C4	3.32	120.58	115.96
2	C	501	HEM	C3B-C2B-C1B	3.28	108.87	106.41
3	B	502	H4B	N1-C2-N3	-3.28	120.46	125.48

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	HEM	C4C-CHD-C1D	3.16	126.73	122.56
4	D	503	A1BTY	C17-C15-C14	-3.16	114.49	120.94
2	D	501	HEM	C3B-C2B-C1B	3.00	108.67	106.41
2	B	501	HEM	C1B-NB-C4B	2.94	108.69	105.21
4	B	503	A1BTY	C17-C15-C14	-2.93	114.95	120.94
2	A	501	HEM	C3B-C4B-NB	-2.91	107.38	109.47
2	C	501	HEM	C1B-NB-C4B	2.83	108.55	105.21
2	D	501	HEM	CMC-C2C-C3C	2.81	130.30	124.68
3	D	502	H4B	C2-N1-C8A	2.80	121.24	114.59
2	A	501	HEM	CBD-CAD-C3D	-2.77	104.88	112.53
2	B	501	HEM	C4D-ND-C1D	2.76	108.47	105.21
5	A	505	BTB	O4-C4-C2	2.75	117.87	111.40
4	A	503	A1BTY	C17-C15-C14	-2.73	115.37	120.94
2	A	501	HEM	C1B-NB-C4B	2.71	108.42	105.21
2	D	501	HEM	C4C-CHD-C1D	2.70	126.12	122.56
3	B	502	H4B	C2-N1-C8A	2.65	120.89	114.59
2	A	501	HEM	C3D-C4D-ND	-2.65	107.27	110.17
2	C	501	HEM	C4D-ND-C1D	2.65	108.34	105.21
4	B	503	A1BTY	C15-C17-N18	-2.63	104.52	112.79
2	D	501	HEM	C1B-NB-C4B	2.62	108.31	105.21
3	C	502	H4B	C2-N1-C8A	2.59	120.75	114.59
4	A	503	A1BTY	C11-N08-C06	-2.56	122.53	128.41
2	B	501	HEM	C3B-C4B-NB	-2.55	107.64	109.47
3	A	502	H4B	C2-N1-C8A	2.53	120.60	114.59
2	B	501	HEM	CMA-C3A-C4A	-2.50	124.80	128.46
2	A	501	HEM	CMA-C3A-C4A	-2.47	124.84	128.46
2	C	501	HEM	C4C-CHD-C1D	2.45	125.79	122.56
3	D	502	H4B	N2-C2-N1	2.43	120.87	117.22
2	A	501	HEM	C4D-ND-C1D	2.40	108.05	105.21
2	B	501	HEM	CHC-C4B-C3B	2.40	128.24	124.57
2	C	501	HEM	C3B-C4B-NB	-2.38	107.76	109.47
2	D	501	HEM	CMA-C3A-C4A	-2.33	125.04	128.46
2	B	501	HEM	CMC-C2C-C3C	2.28	129.24	124.68
2	C	501	HEM	CMA-C3A-C4A	-2.24	125.18	128.46
2	D	501	HEM	C3B-C4B-NB	-2.23	107.86	109.47
2	C	501	HEM	C3D-C4D-ND	-2.15	107.81	110.17
4	D	503	A1BTY	C19-C20-C21	-2.15	107.99	112.83
2	C	501	HEM	C4A-C3A-C2A	2.15	108.49	107.00
2	D	501	HEM	C4D-ND-C1D	2.13	107.73	105.21
4	B	503	A1BTY	C14-C15-C16	2.12	121.48	118.55
3	B	502	H4B	N2-C2-N3	2.11	120.39	117.22
2	C	501	HEM	C2B-C1B-NB	-2.10	107.43	109.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	503	A1BTY	C13-C12-C11	2.09	122.14	119.73
3	B	502	H4B	O10-C10-C9	-2.07	106.34	109.77
2	A	501	HEM	C3B-C2B-C1B	2.07	107.97	106.41
4	D	503	A1BTY	C14-C15-C16	2.03	121.35	118.55
2	B	501	HEM	C3B-C2B-C1B	2.01	107.92	106.41

There are no chirality outliers.

All (102) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	503	A1BTY	N18-C19-C20-C21
4	B	503	A1BTY	N18-C19-C20-C21
4	C	503	A1BTY	N18-C19-C20-C21
4	D	503	A1BTY	C35-C36-N38-C24
4	D	503	A1BTY	N37-C36-N38-C24
5	A	504	BTB	O1-C1-C2-C3
5	A	504	BTB	O1-C1-C2-C4
5	A	504	BTB	O1-C1-C2-N
5	A	504	BTB	C1-C2-C4-O4
5	A	504	BTB	C3-C2-C4-O4
5	A	504	BTB	N-C2-C4-O4
5	A	505	BTB	C1-C2-C3-O3
5	A	505	BTB	C4-C2-C3-O3
5	A	505	BTB	N-C2-C3-O3
5	A	505	BTB	C3-C2-C4-O4
5	A	506	BTB	C1-C2-C3-O3
5	A	506	BTB	C4-C2-C3-O3
5	A	506	BTB	N-C2-C3-O3
5	B	504	BTB	O1-C1-C2-C3
5	B	504	BTB	O1-C1-C2-C4
5	B	504	BTB	O1-C1-C2-N
5	B	505	BTB	O1-C1-C2-C3
5	B	505	BTB	O1-C1-C2-C4
5	B	505	BTB	O1-C1-C2-N
5	B	505	BTB	N-C2-C3-O3
5	B	505	BTB	C3-C2-C4-O4
5	B	505	BTB	C1-C2-N-C5
5	B	505	BTB	C1-C2-N-C7
5	B	505	BTB	C3-C2-N-C5
5	B	505	BTB	C4-C2-N-C5
5	B	509	BTB	O1-C1-C2-C3
5	B	509	BTB	O1-C1-C2-C4

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Mol	Chain	Res	Type	Atoms
5	B	509	BTB	O1-C1-C2-N
5	C	504	BTB	C1-C2-C3-O3
5	C	504	BTB	C4-C2-C3-O3
5	C	504	BTB	N-C2-C3-O3
5	C	504	BTB	N-C2-C4-O4
5	C	504	BTB	C4-C2-N-C5
5	C	504	BTB	C4-C2-N-C7
5	D	505	BTB	O1-C1-C2-C4
5	D	505	BTB	C1-C2-C3-O3
5	D	505	BTB	C4-C2-C3-O3
5	D	505	BTB	N-C2-C3-O3
5	D	505	BTB	C1-C2-C4-O4
5	D	505	BTB	C3-C2-C4-O4
5	D	505	BTB	N-C2-C4-O4
5	D	505	BTB	C1-C2-N-C5
5	D	505	BTB	C1-C2-N-C7
5	D	505	BTB	C3-C2-N-C5
5	D	505	BTB	C3-C2-N-C7
5	D	505	BTB	C4-C2-N-C5
5	D	505	BTB	C4-C2-N-C7
5	D	505	BTB	C8-C7-N-C5
6	A	508	GOL	O1-C1-C2-C3
6	A	508	GOL	C1-C2-C3-O3
6	C	508	GOL	O1-C1-C2-C3
6	C	509	GOL	O1-C1-C2-O2
6	C	509	GOL	O1-C1-C2-C3
4	C	503	A1BTY	C15-C17-N18-C19
5	A	505	BTB	N-C7-C8-O8
6	C	506	GOL	O2-C2-C3-O3
6	C	508	GOL	O1-C1-C2-O2
4	A	503	A1BTY	C15-C17-N18-C19
5	A	506	BTB	N-C5-C6-O6
5	A	505	BTB	N-C5-C6-O6
4	B	503	A1BTY	C15-C17-N18-C19
6	C	506	GOL	O1-C1-C2-C3
6	C	506	GOL	C1-C2-C3-O3
5	D	505	BTB	N-C5-C6-O6
6	A	508	GOL	O1-C1-C2-O2
5	B	505	BTB	N-C5-C6-O6
6	C	506	GOL	O1-C1-C2-O2
5	C	504	BTB	N-C7-C8-O8
4	A	503	A1BTY	C19-C20-C21-C26

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Mol	Chain	Res	Type	Atoms
4	B	503	A1BTY	C19-C20-C21-C26
4	A	503	A1BTY	C19-C20-C21-C22
4	B	503	A1BTY	C19-C20-C21-C22
6	A	508	GOL	O2-C2-C3-O3
6	B	506	GOL	O1-C1-C2-O2
6	D	506	GOL	O1-C1-C2-O2
6	D	506	GOL	O1-C1-C2-C3
4	C	503	A1BTY	C19-C20-C21-C22
4	C	503	A1BTY	C19-C20-C21-C26
2	C	501	HEM	C4B-C3B-CAB-CBB
4	D	503	A1BTY	C19-C20-C21-C26
2	C	501	HEM	C2A-CAA-CBA-CGA
5	C	507	BTB	C3-C2-C4-O4
4	D	503	A1BTY	C19-C20-C21-C22
4	A	503	A1BTY	C35-C36-N38-C24
5	B	505	BTB	C3-C2-N-C7
5	B	505	BTB	C4-C2-N-C7
5	C	504	BTB	C1-C2-N-C5
5	C	504	BTB	C3-C2-N-C5
5	C	504	BTB	C3-C2-N-C7
5	C	507	BTB	N-C2-C4-O4
4	A	503	A1BTY	N37-C36-N38-C24
5	B	504	BTB	C3-C2-C4-O4
6	B	506	GOL	O1-C1-C2-C3
5	A	505	BTB	N-C2-C4-O4
5	B	505	BTB	N-C2-C4-O4
5	C	504	BTB	C1-C2-N-C7
4	B	503	A1BTY	N07-C06-N08-C11

There are no ring outliers.

21 monomers are involved in 46 short contacts:

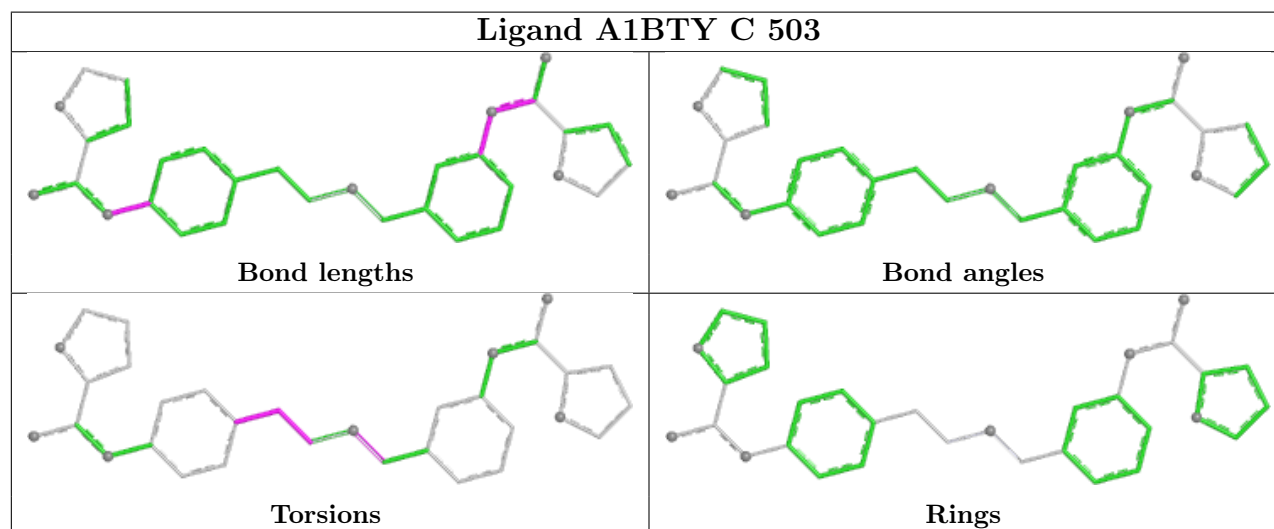
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	506	GOL	2	0
3	D	502	H4B	1	0
5	A	505	BTB	1	0
5	D	504	BTB	1	0
4	B	503	A1BTY	2	0
5	A	506	BTB	2	0
2	B	501	HEM	2	0
5	B	505	BTB	3	0
5	C	507	BTB	1	0

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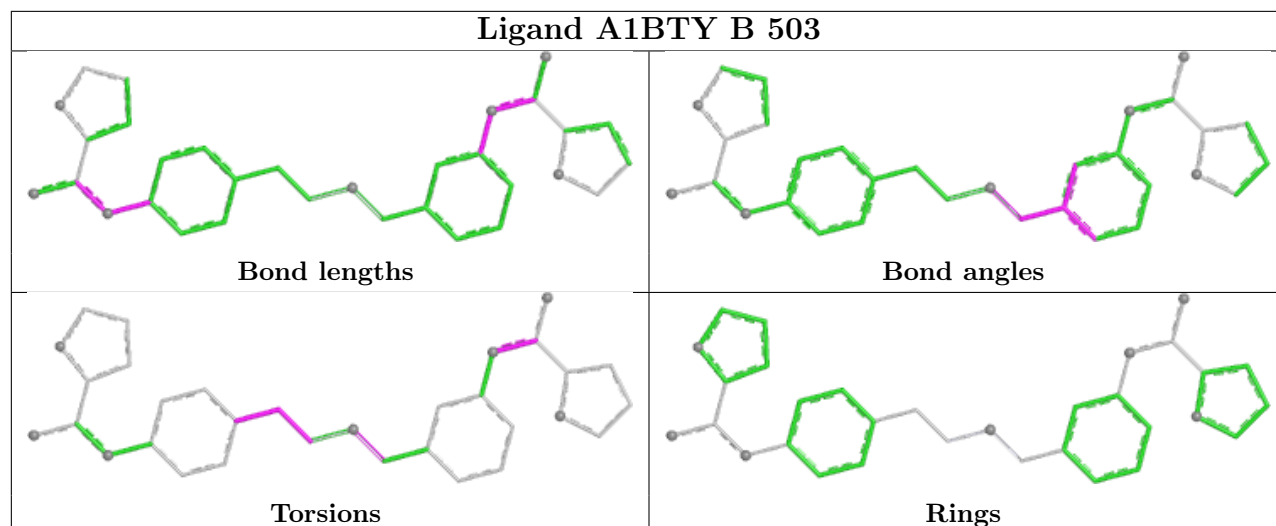
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	D	505	BTB	4	0
3	A	502	H4B	1	0
5	A	504	BTB	2	0
2	A	501	HEM	3	0
6	C	506	GOL	1	0
5	B	509	BTB	8	0
5	C	504	BTB	4	0
4	D	503	A1BTY	1	0
2	C	501	HEM	2	0
2	D	501	HEM	2	0
4	A	503	A1BTY	2	0
3	B	502	H4B	1	0

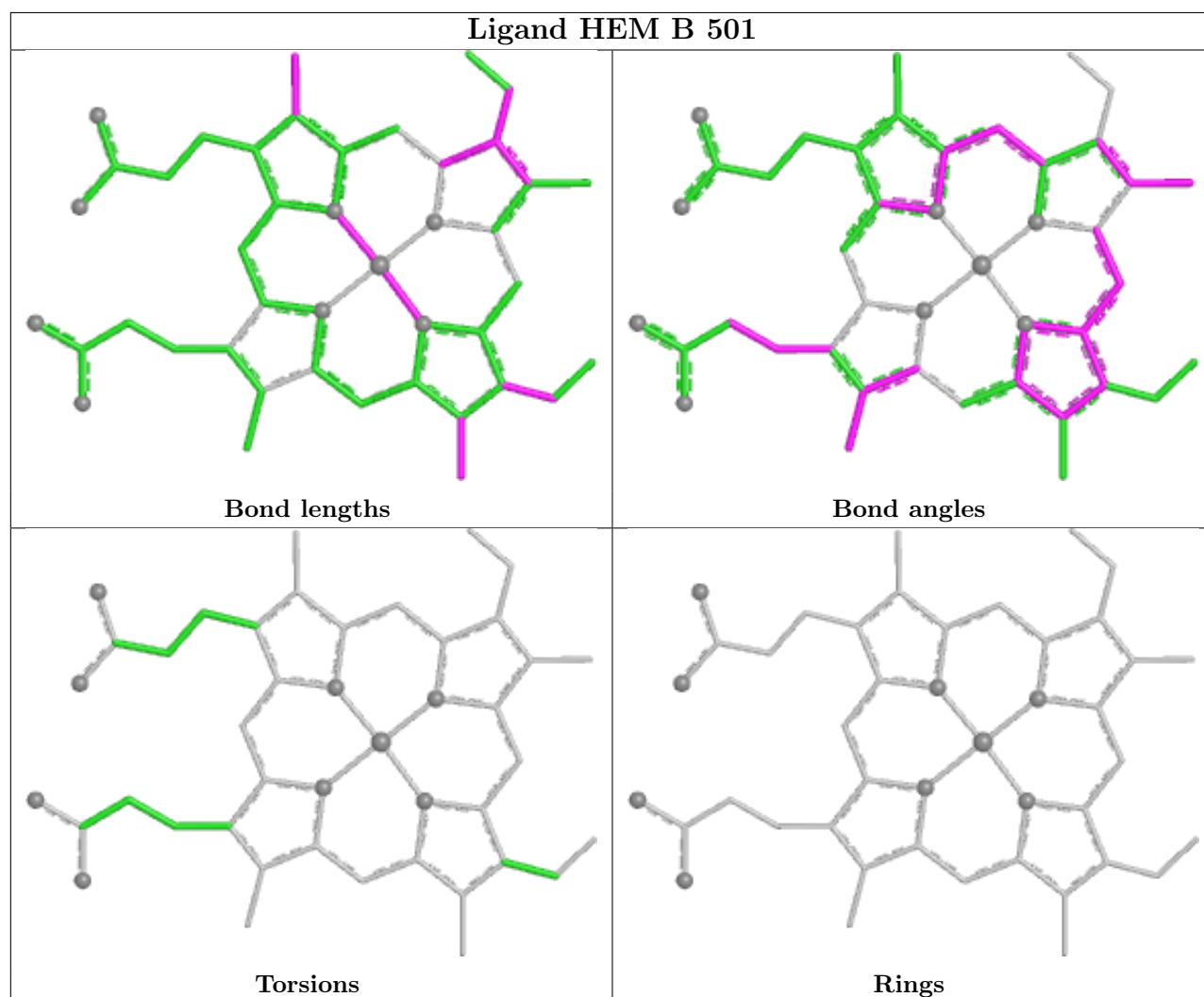
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

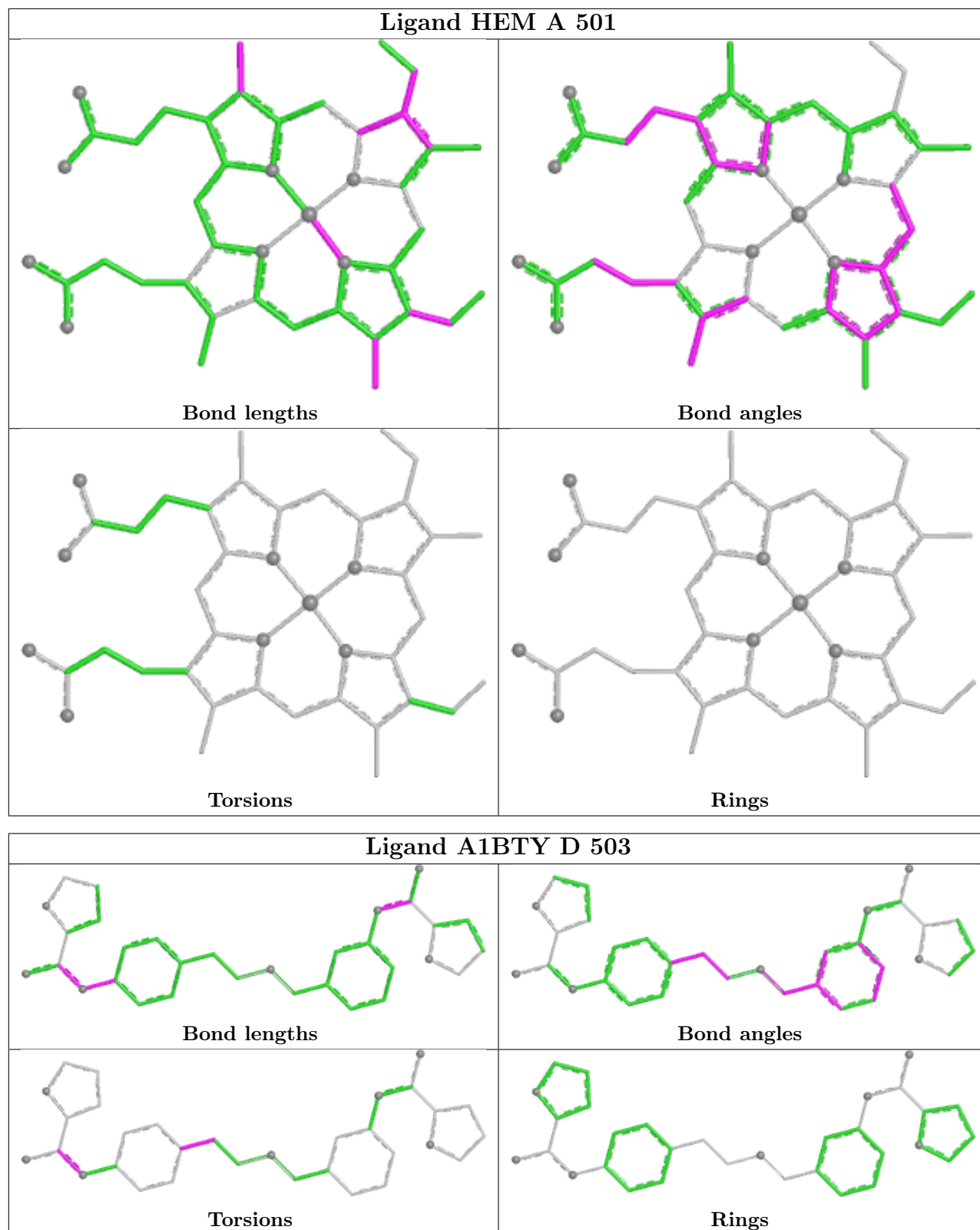


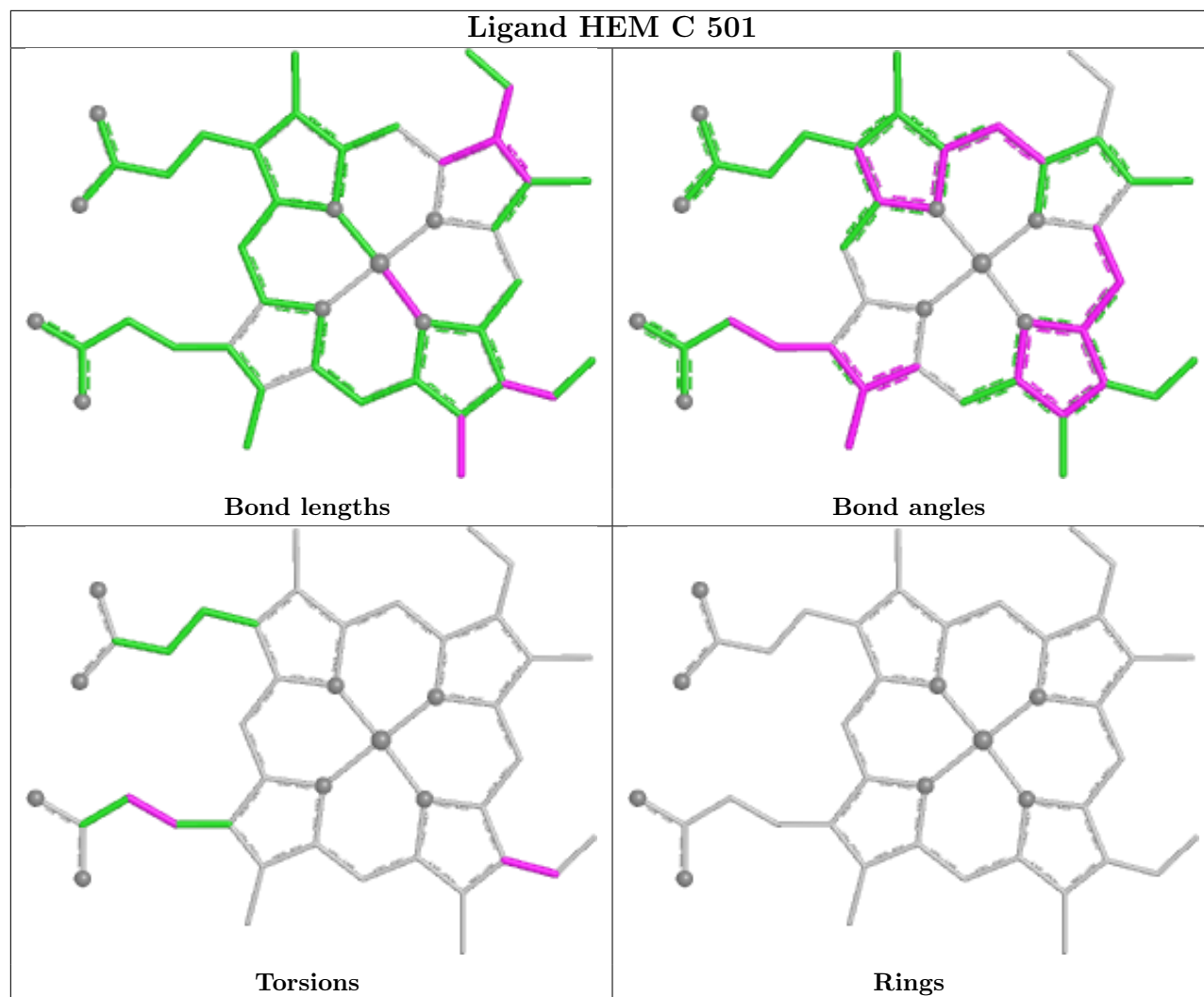
Ligand A1BTY B 503

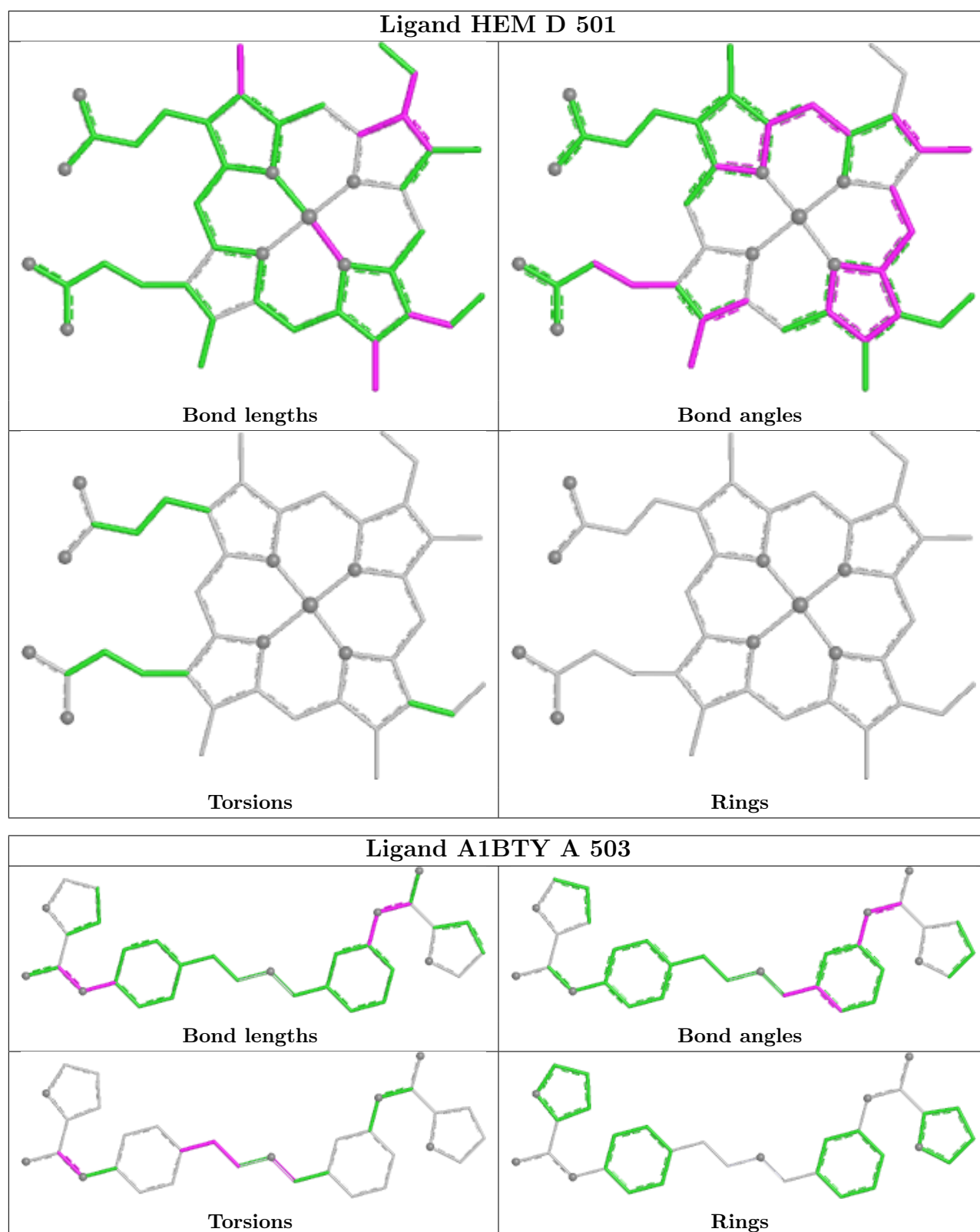


Ligand HEM B 501









5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	402/440 (91%)	0.29	7 (1%) 69 74	24, 50, 81, 96	3 (0%)
1	B	403/440 (91%)	-0.06	3 (0%) 84 88	20, 38, 64, 85	4 (0%)
1	C	402/440 (91%)	0.64	25 (6%) 28 31	23, 57, 100, 117	3 (0%)
1	D	402/440 (91%)	0.07	7 (1%) 69 74	23, 39, 70, 91	5 (1%)
All	All	1609/1760 (91%)	0.23	42 (2%) 57 64	20, 45, 84, 117	15 (0%)

All (42) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	204	ALA	4.7
1	C	106	PRO	4.3
1	A	107	ARG	3.9
1	A	106	PRO	3.8
1	D	119	ALA	3.7
1	C	268	VAL	3.3
1	C	259	GLY	3.3
1	B	106	PRO	3.3
1	C	159	ALA	3.1
1	C	119	ALA	3.0
1	D	106	PRO	2.9
1	C	304	LEU	2.9
1	A	119	ALA	2.9
1	B	119	ALA	2.7
1	C	157	VAL	2.7
1	D	145	ALA	2.6
1	C	299	PRO	2.6
1	C	153	VAL	2.6
1	A	468	PHE	2.6
1	C	163	TYR	2.6
1	D	67	LYS	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	150	LEU	2.4
1	C	235	CYS	2.3
1	C	162	THR	2.3
1	D	144	GLN	2.3
1	C	480	TRP	2.3
1	A	158	ALA	2.3
1	C	160	THR	2.3
1	C	261	VAL	2.3
1	C	120	PRO	2.2
1	C	107	ARG	2.2
1	C	145	ALA	2.2
1	B	468	PHE	2.2
1	C	309	LEU	2.2
1	A	204	ALA	2.1
1	C	105	PHE	2.1
1	C	345	GLY	2.1
1	C	131	ILE	2.0
1	A	480	TRP	2.0
1	D	238	ARG	2.0
1	C	134	TYR	2.0
1	D	120	PRO	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	GOL	C	509	6/6	0.47	0.16	90,95,96,97	0
5	BTB	C	507	14/14	0.55	0.20	90,102,110,110	0

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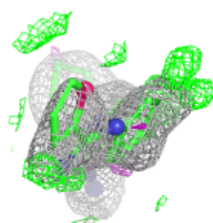
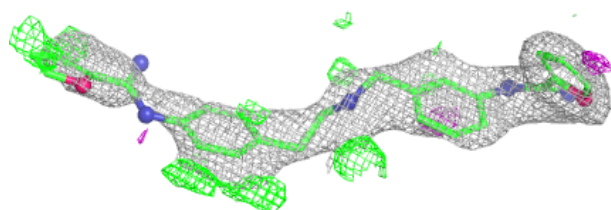
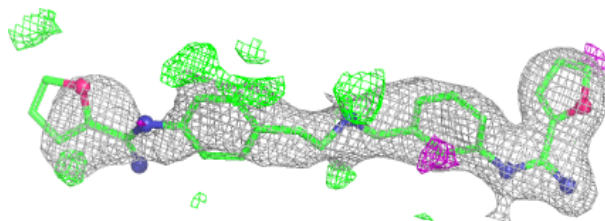
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	BTB	A	506	14/14	0.62	0.17	86,93,95,96	0
6	GOL	C	506	6/6	0.66	0.19	56,73,74,82	0
5	BTB	C	504	14/14	0.68	0.19	38,74,82,90	0
5	BTB	B	505	14/14	0.69	0.23	57,71,82,84	0
6	GOL	C	508	6/6	0.70	0.15	67,73,76,78	0
5	BTB	A	505	14/14	0.70	0.17	59,80,85,85	0
5	BTB	D	505	14/14	0.71	0.19	55,72,79,80	0
6	GOL	B	506	6/6	0.76	0.21	68,73,80,88	0
6	GOL	A	508	6/6	0.77	0.23	58,64,74,77	0
4	A1BTY	C	503	32/32	0.81	0.18	43,77,93,94	0
6	GOL	D	506	6/6	0.83	0.27	76,79,83,85	0
4	A1BTY	A	503	32/32	0.86	0.16	32,65,103,105	0
5	BTB	D	504	14/14	0.86	0.17	50,59,78,84	0
5	BTB	B	504	14/14	0.86	0.15	41,61,71,74	0
4	A1BTY	D	503	32/32	0.88	0.17	26,54,116,119	0
4	A1BTY	B	503	32/32	0.89	0.16	25,57,98,102	0
8	GD	C	511	1/1	0.91	0.09	113,113,113,113	0
5	BTB	B	509	14/14	0.92	0.11	32,74,85,88	0
6	GOL	A	507	6/6	0.92	0.09	37,53,66,71	0
5	BTB	A	504	14/14	0.92	0.14	19,69,76,77	0
3	H4B	C	502	17/17	0.93	0.08	40,47,54,58	0
3	H4B	A	502	17/17	0.94	0.09	30,40,50,51	0
3	H4B	D	502	17/17	0.94	0.08	26,36,43,44	0
8	GD	A	510	1/1	0.95	0.09	85,85,85,85	0
7	CL	C	510	1/1	0.95	0.08	60,60,60,60	0
8	GD	A	511	1/1	0.96	0.07	102,102,102,102	0
3	H4B	B	502	17/17	0.96	0.06	27,35,42,43	0
2	HEM	A	501	43/43	0.97	0.08	28,37,48,57	0
7	CL	A	509	1/1	0.97	0.07	50,50,50,50	0
8	GD	B	508	1/1	0.97	0.05	45,45,45,45	0
2	HEM	C	501	43/43	0.97	0.09	30,43,57,59	0
2	HEM	D	501	43/43	0.98	0.06	20,27,41,46	0
7	CL	B	507	1/1	0.98	0.06	44,44,44,44	0
2	HEM	B	501	43/43	0.98	0.06	20,27,38,43	0
7	CL	D	507	1/1	0.98	0.07	40,40,40,40	0
8	GD	D	508	1/1	0.98	0.04	41,41,41,41	0
9	ZN	C	505	1/1	0.98	0.03	38,38,38,38	0
9	ZN	A	512	1/1	1.00	0.04	31,31,31,31	0

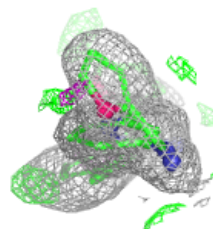
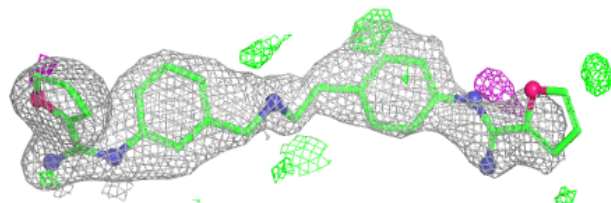
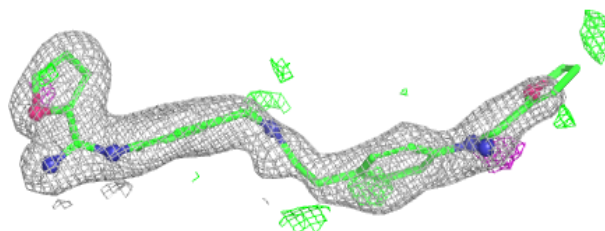
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around A1BTY C 503:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

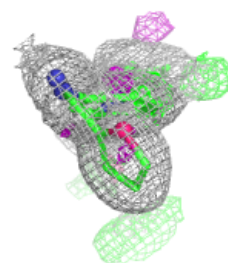
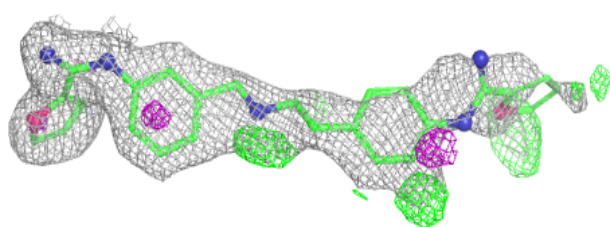
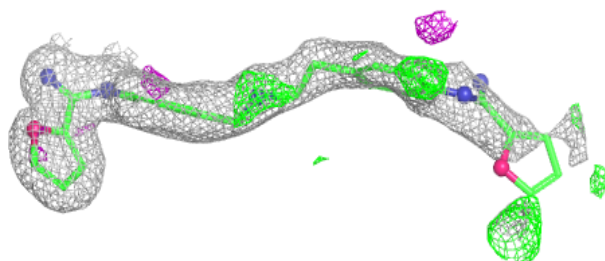
**Electron density around A1BTY A 503:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

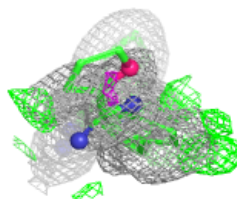
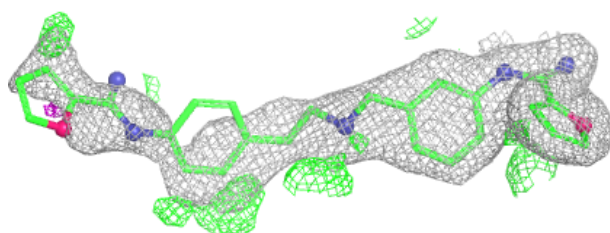
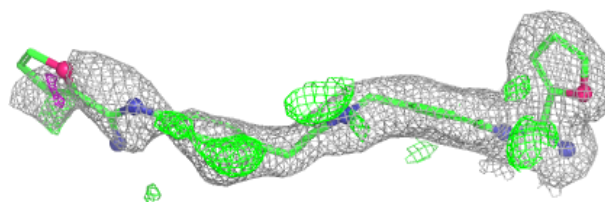


Electron density around A1BTY D 503:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

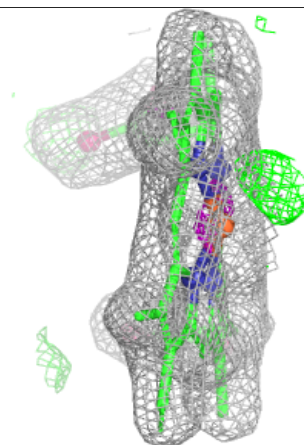
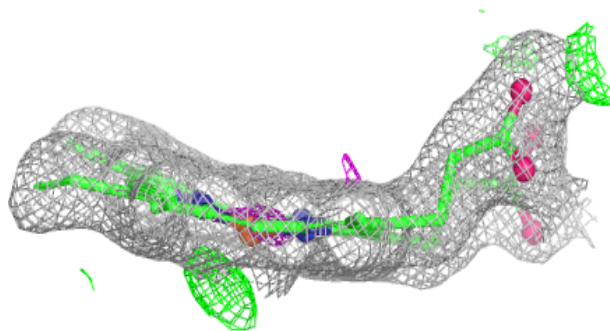
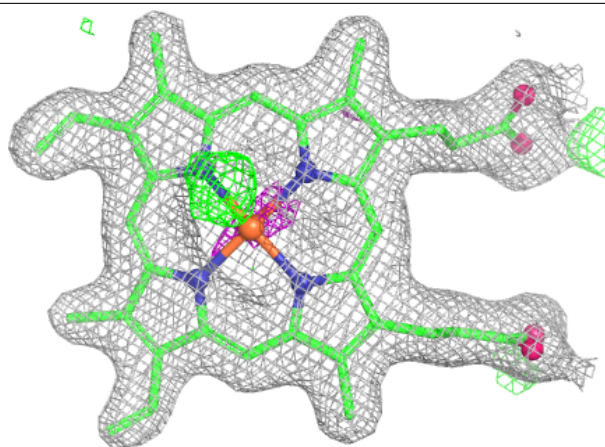
**Electron density around A1BTY B 503:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



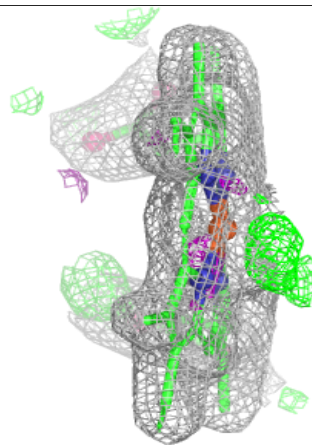
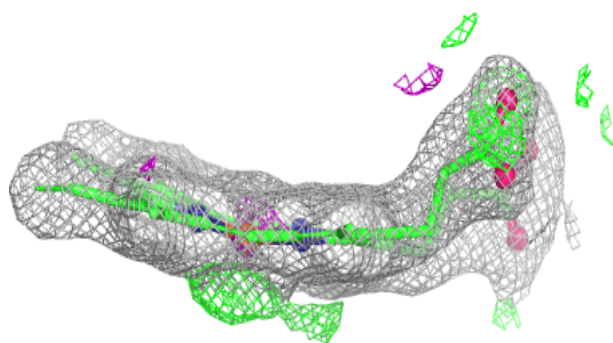
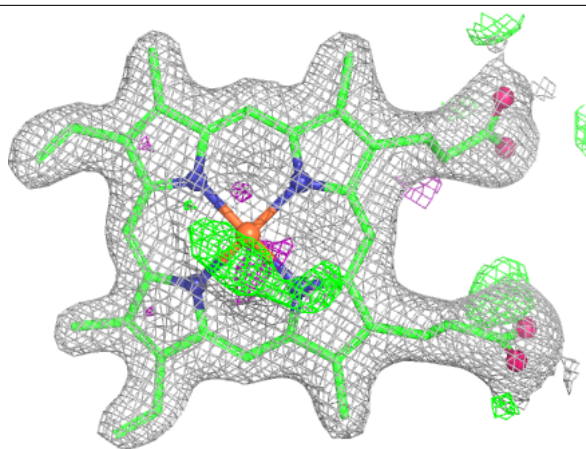
Electron density around HEM A 501:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



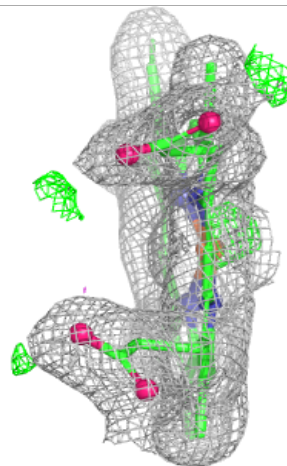
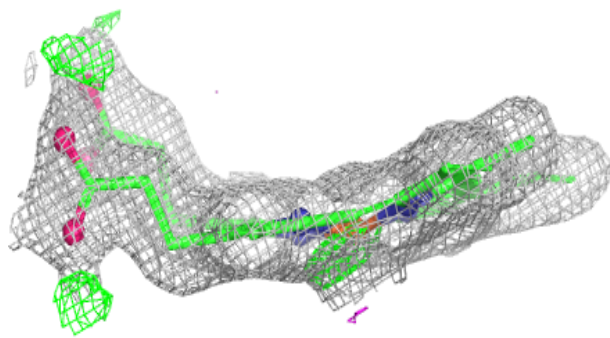
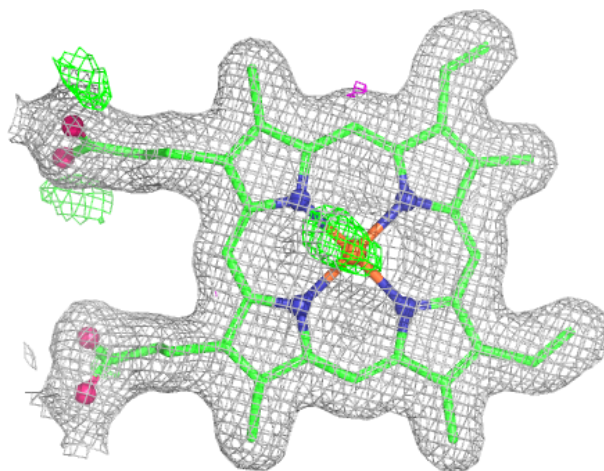
Electron density around HEM C 501:

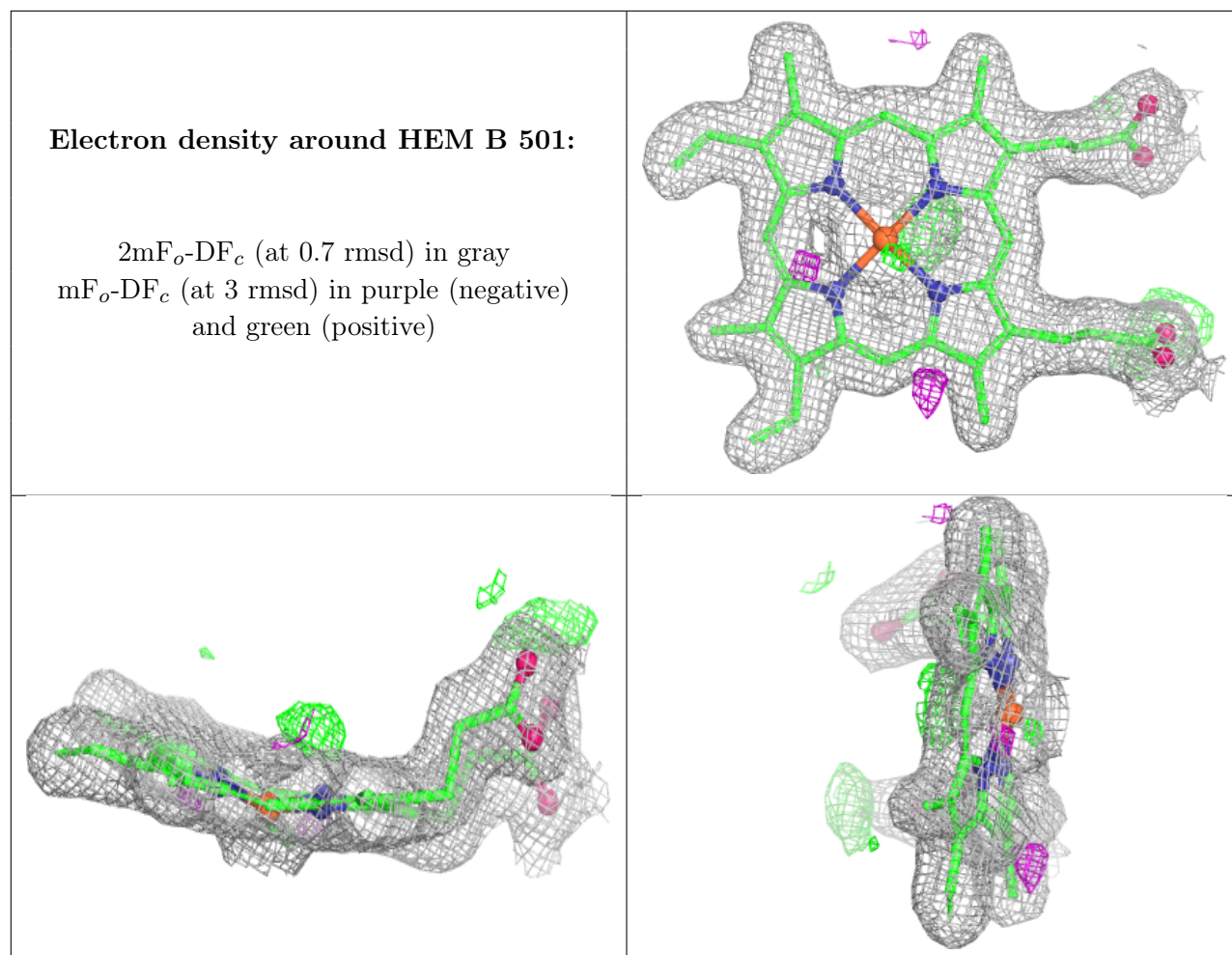
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM D 501:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





6.5 Other polymers ⓘ

There are no such residues in this entry.